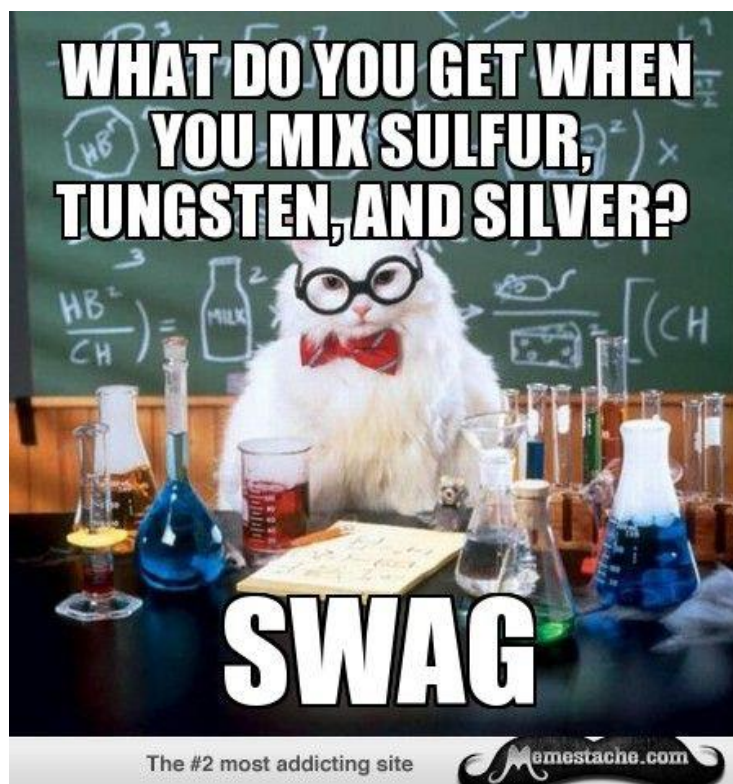


Regents Chemistry:

Practice Packet:

Unit 2: Matter



Vocabulary: _____

Lesson 1: _____

Lesson 2: _____

Lesson 3: _____

Lesson 4: _____

Practice Packet: LEVEL 2 MATTER

VOCABULARY

For each word, provide a short but specific definition from YOUR OWN BRAIN! No boring textbook definitions. Write something to help you remember the word. Explain the word as if you were explaining it to an elementary school student. Give an example if you can. Don't use the words given in your definition!

Alloy: _____

Amalgam: _____

Aqueous: _____

Atom: _____

Change: _____

Chemical Property: _____

Chromatography: _____

Compound: _____

Diatomic element: _____

Distillation: _____

Element: _____

Extensive: _____

Filtration: _____

Gas: _____

Heterogeneous Mixture: _____

Homogeneous Mixture: _____

Intensive: _____

Liquid: _____

Matter: _____

Mixture: _____

Physical Property: _____

Solid: _____

Solution: _____

Temperature: _____

Tincture: _____

Lesson 1: Types of Matter

Objective:

- *Differentiate between compounds, mixtures and elements*
- *Determine if a mixture is homogeneous or heterogeneous*
- *Identify the number of atoms and molecules in a substance based upon the chemical formula*

Classify each of the following with the combination of terms listed below.

pure substance – element

mixture – homogeneous

pure substance – compound

mixture – heterogeneous

- | | | | |
|------------------------|---|------------|-----------|
| 1. HCl (aq) | 2. sugar (C ₁₁ H ₂₂ O ₁₁) | 3. KBr (s) | 4. soil |
| 5. Cl ₂ (g) | 6. CH ₂ (OH) ₂ (aq) | 7. Na (s) | 8. Hg (l) |
-
- | | |
|---|--|
| 9. Matter that is composed of two or more different elements chemically combined in a fixed proportion is classified as
(1) a compound (2) an element
(3) a mixture (4) a solution | 12. A heterogeneous material may be
(1) an element
(2) a compound
(3) a pure substance
(4) a mixture |
| 10. A compound differs from an element in that a compound
(1) is homogeneous
(2) has a definite composition
(3) has a definite melting point
(4) can be decomposed by a chemical reaction | 13. Which statement is an identifying characteristic of a mixture?
(1) a mixture can consist of a single element
(2) a mixture can be separated by physical means
(3) a mixture must have a definite composition by weight
(4) a mixture must be homogeneous |
| 11. A compound differs from a mixture in that a compound always has a
(1) homogeneous composition
(2) maximum of two elements
(3) minimum of three elements
(4) heterogeneous composition | 14. Which must be a mixture of substances?
(1) solid (2) liquid
(3) gas (4) solution |

Practice Packet: LEVEL 2 MATTER

15. Which substance can be decomposed by chemical means?
(1) aluminum (2) octane (3) silicon (4) xenon
16. Which substance can be decomposed by chemical means?
(1) ammonia (2) oxygen
(3) phosphorus (4) silicon
17. Which substance can not be broken down by a chemical reaction?
(1) ammonia (2) argon (3) methane (4) water
18. Two substances, A and Z, are to be identified. Substance A can not be broken down by a chemical change. Substance Z can be broken down by a chemical change. What can be concluded about these substances?
(1) Both substances are elements.
(2) Both substances are compounds.
(3) Substance A is an element and substance Z is a compound.
(4) Substance A is a compound and substance Z is an element.

Interpreting Chemical Formulas

19. How many atoms of the element sodium (Na) are there in one Na₂S? _____
20. How many atoms of each type of element in the formulas?
CO _____
CO₂ _____
H₂SO₄ _____
Br₂ _____

ASSESS YOURSELF ON THIS LESSON: _____/20

If you missed more than 3, do the Additional Practice. If not, go on to the next hw video!!!

ADDITIONAL PRACTICE LESSON 1:

1. Which terms are used to identify pure substances?
(1) an element and a mixture
(2) an element and a compound
(3) a solution and a mixture
(4) a solution and a compound

Practice Packet: LEVEL 2 MATTER

2. Two different samples decompose when heated. Only one of the samples is soluble in water. Based on this information, these two samples are
- (1) both the same element
 - (2) two different elements
 - (3) both the same compound
 - (4) two different compounds
3. Tetrachloromethane, CCl_4 , is classified as a
- (1) compound because the atoms of the elements are combined in a fixed proportion
 - (2) compound because the atoms of the elements are combined in a proportion that varies
 - (3) mixture because the atoms of the elements are combined in a fixed proportion
 - (4) mixture because the atoms of the elements are combined in a proportion that varies
-

4. The table below shows the mass and volume data for four samples of substances at the same temperature and pressure.

Masses and Volumes of Four Samples

Sample	Mass (g)	Volume (mL)
A	30.	60.
B	40.	50.
C	45	90.
D	90.	120.

Which two samples could consist of the same substance?

_____ and _____

Interpreting Chemical Formulas

5. How many units of KCl are expressed by “ 4KCl ”? _____
6. How many Na_2S are shown by “ $3\text{Na}_2\text{S}$ ”? _____
7. How many atoms of C, of H and of O are communicated by writing “ $3 \text{C}_6\text{H}_{12}\text{O}_6$ ”?
8. C: _____ H: _____ O: _____

ASSESS YOURSELF ON THIS ADDITIONAL PRACTICE: _____/8

If you missed more than 1 you should see me for extra help and/or re-watch the lesson video assignment

Lesson 2: Separating a Mixture

Objective:

- Determine how to separate different types of mixtures

Substances in mixtures retain their own physical properties which can be used to physically separate the components. Complete the chart below...

Mixture	Separate by...	Physical Property
<i>Example:</i> Coffee	<i>Boiling off the water, collecting it, leaving the coffee bean extract and sugar</i>	<i>Boiling point</i>
Iron Chips & Soil		
Sugar & Water		
Salt & Sand		
Water & Rubbing Alcohol		

For each separation technique below, identify the physical property that is used and briefly describe the process:

Filtration: _____

Distillation: _____

Chromatography: _____

ASSESS YOURSELF ON THIS LESSON: _____/11

If you missed more than 3, do the Additional Practice. If not, go on to the next hw video!!!

Lesson 3: Particle Diagrams

Objective:

- Differentiate between different types of particle diagrams
- Construct particle diagrams for pure substances and mixtures

Classify each of the pictures below by placing the correct label in the blanks below:

A= Element

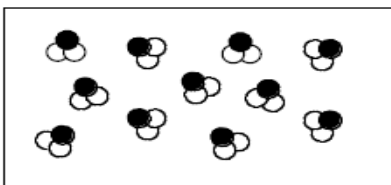
D= Mixture of compounds

B= Compound

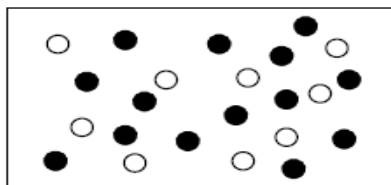
E= Mixture of elements and compounds

C= Mixture of elements

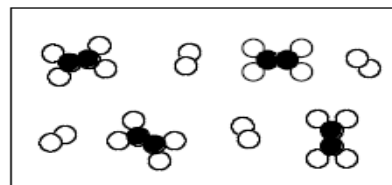
Each circle represents an atom and each different color represents a different kind of atom. If two atoms are touching then they are bonded together. *Then give an example for each (ex. #1 H₂O)*



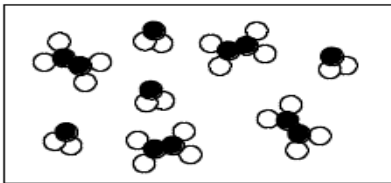
1) _____



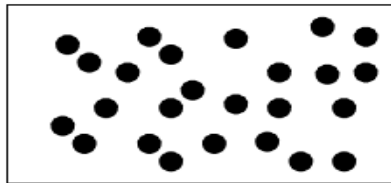
2) _____



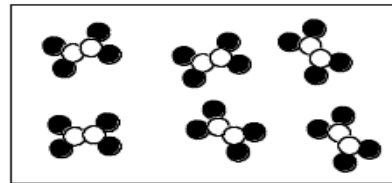
3) _____



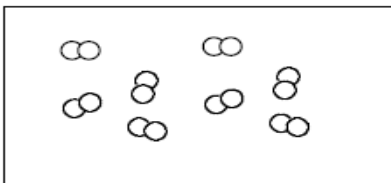
4) _____



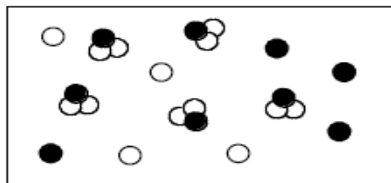
5) _____



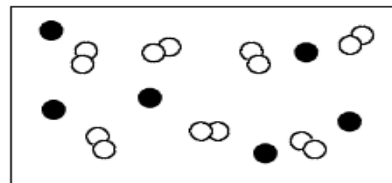
6) _____



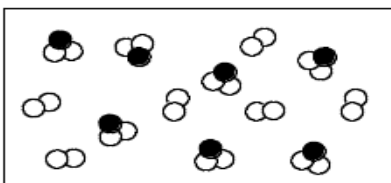
7) _____



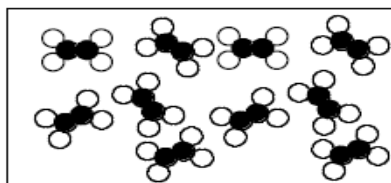
8) _____



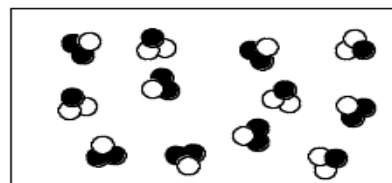
9) _____



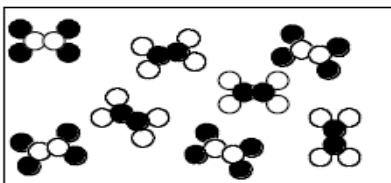
10) _____



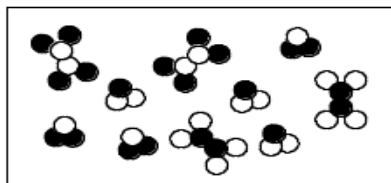
11) _____



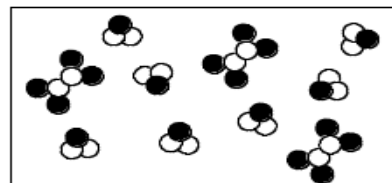
12) _____



13) _____



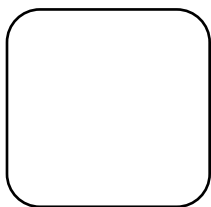
14) _____



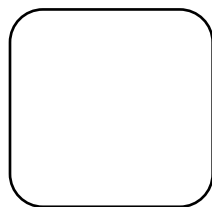
15) _____

Drawing Particle Arrangements

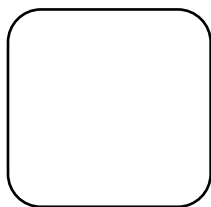
16.) Draw a particle diagram for each of the following below. *Then give an example for each.*



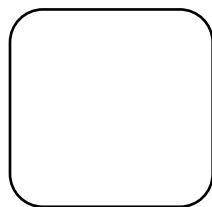
pure diatomic
element



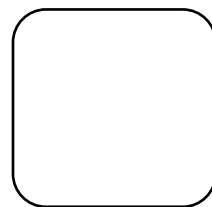
pure diatomic
compound



mixture of
two elements



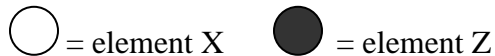
mixture of
an element &
a compound



mixture of two
diatomic elements
& a compound

17.) In terms of composition/type of atoms, what is the difference between a monatomic element, a diatomic element, and a diatomic compound?

18.) Use the following key for the question below:



Draw 4 molecules of compound X_2Z in the box on the right



ASSESS YOURSELF ON THIS LESSON: _____/18

If you missed more than 3, do the Additional Practice. If not, go on to the next hw video!!!

ADDITIONAL PRACTICE LESSON 3

Use the following key for the next two questions.



Draw 8 atoms of element X



Draw a Homogeneous mixture of element Z with element X (10 atoms of each element).



ASSESS YOURSELF ON THIS ADDITIONAL PRACTICE: _____/2

If you missed any question you should see me for extra help and/or re-watch the lesson video assignment

LESSON 4: PROPERTIES AND CHANGES OF MATTER

Objective:

- *Identify the states of matter*
- *Differentiate between physical and chemical changes*
- *Determine the phase of a substance @ STP using table S*
- *Construct particle diagrams for solids, liquids and gases*

Directions: Complete the chart to the best of your ability.

1) Situation	Type of Change (P or C)	Explanation: (Physical: Still the same substance) (chemical: A new substance formed)
2) Water freezing		
3) Decomposing of a dead organism		
4) Mixing the ingredients for a cake		
5) Rusting (corroding) of a nail		
6) Melting ice off a windshield		
7) Combustion (burning) of gasoline		
8) $\text{CO}_2 (\text{s}) \rightarrow \text{CO}_2 (\text{g})$		
9) $\text{H}_2\text{O} (\text{g}) \rightarrow \text{H}_2\text{O} (\text{l})$		
10) $\text{NaCl} (\text{s}) \xrightarrow{\text{H}_2\text{O}} \text{NaCl} (\text{aq})$		

Practice Packet: LEVEL 2 MATTER

Room temperature in degrees Fahrenheit (°F) is about 72°F. In degrees Celsius (°C) this is about 25°C. In the classroom you can observe all 3 states (solid, liquid, and gas) at the same temperature. ***This means that not all substances have the same phase at the same temperature.*** Scientists had to develop a term to refer to talk about substances under “**normal**” conditions. It is called **STP**. At STP, oxygen is a gas, while Cu is a solid. **STP= STANDARD TEMPERATURE AND PRESSURE**

- Where can you find STP conditions in your Reference Table? Table _____
- Standard temperature = _____ °C or _____ K
- Standard pressure = _____ kPa or _____ atm
- In your own words, summarize what STP is and why it is necessary.

	←MP→	←MP→	←BP→	←BP→
Description	If temp is lower than the melting point, it has not melted yet.	If temp is higher than the melting point, it has melted already.	If temp is lower than the boiling point, it has not boiled yet.	If temp is higher than the boiling point, it has boiled already.
Resulting Phase	Solid	Liquid	Liquid	Gas

For Example:

Substance	Color	Melting Point (°C)	Boiling Point (°C)
Bromine	Red-Brown	-7	59
Chlorine	Green-yellow	-101	-34
Ethanol	Colorless	-117	78
Mercury	Silvery-white	-39	357
Neon	Colorless	-249	-246
Sulfur	Yellow	115	445
Water	Colorless	0	100

- Which colorless substance is a liquid at -30°C? _____
- Which colorless substance is a gas at 60 °C? _____
- Which substance is a solid at 7 °C? _____
- Which element is a liquid when mercury boils? _____

Notice water's MP/BP! You will be expected to know this throughout the year! This refers to *distilled* water (pure H₂O), *not tap* water (what comes out of your sink that has extra substances in it).

Practice Packet: LEVEL 2 MATTER

Some physical properties (including melting and boiling point!) of the first 92 elements are listed on **Table S** in the reference tables. Suppose you were in Boston, MA (sea level) and it was cold enough to freeze water (0°C).

What state of matter, would each of the following substances exist at?
(Note that Table S has MP/BP in Kelvin!)

19. Hydrogen

20. Lithium

21. Bromine

22. At STP, which list of elements contains a solid, a liquid, and a gas?

(1) Hf, Hg, He

(2) Cr, Cl_2 , C

(3) Ba, Br_2 , B

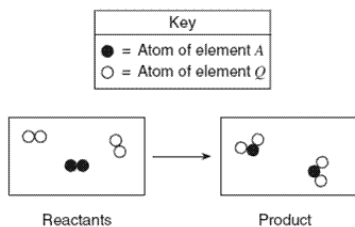
(4) Se, Sn, Sr

ASSESS YOURSELF ON THIS LESSON: _____/18

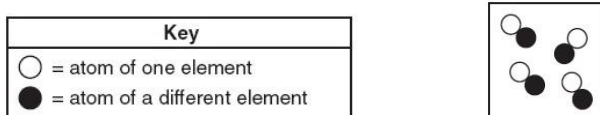
If you missed more than 3, do the Additional Practice. If not, go on to the next hw video!!!

ADDITIONAL PRACTICE LESSON 4:

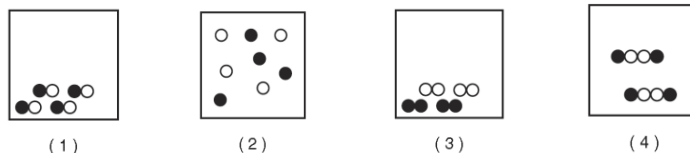
1. The diagram below represents the starting materials (reactants) and ending materials (products) after a change has taken place. Was the change physical or chemical? Explain.



2. Given the particle diagram representing four molecules of a substance:



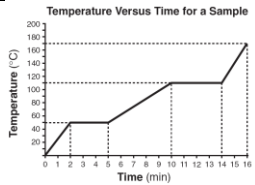
Which particle diagram best represents this same substance after a physical change has taken place?



ASSESS YOURSELF ON THIS ADDITIONAL PRACTICE: _____/2

If you missed any question you should see me for extra help and/or re-watch the lesson video assignment

Practice Packet: LEVEL 2 MATTER

	Key Idea Question	Justify your answer with an explanation or calculation.	Confidence Level										
			None	Moderate					Fully				
			0	1	2	3	4	5	6	7	8	9	10
1	Which of the following is a chemical property? a. flammability c. color b. phase d. malleability		Prediscussion: Post discussion:										
2	Which of the following takes the shape and volume of the container? a. HCl(aq) c. H ₂ (g) b. Br ₂ (l) d. Fe(s)		Prediscussion: Post discussion:										
3	Which can be broken down chemically? a. C ₂ H ₄ c. Cl ₂ b. Xe d. sulfur		Prediscussion: Post discussion:										
4	Which of the following gases has the most kinetic energy? a. He at 20C c. Kr at 283K b. Ar at 40C d. Rn at 293 K		Prediscussion: Post discussion:										
5	Which of the following is equivalent to 50kPa? a. 50,000 Pa c. 0.050 Pa b. 50 Pa d. 0.005 Pa		Prediscussion: Post discussion:										
6	Describe the processes used to separate a heterogeneous mixture and how it is different than the process to separate a homogenous mixture.		Prediscussion: Post discussion:										
7	Draw diagrams to represent the processes of melting, condensation, freezing, evaporation, and sublimation.		Prediscussion: Post discussion:										
8	Describe the changes in kinetic and potential energy during the first line segment of the curve. 		Prediscussion: Post discussion:										
9	A student found the volume of a solution to be 45.0 mL but the accepted value was 40.0mL. Calculate the percent error.		Prediscussion: Post discussion:										
10	Calculate the mass of 25.00mL of bromine with proper significant figures.		Prediscussion: Post discussion:										

Practice Packet: LEVEL 2 MATTER

Common Sense Chemistry Review

Can you apply what you've learned to seem smarter than you friends?

1. A student reads the packaging slip for the recent Amazon order and he was charged an extra fee for shipping a package over 20kg. The student knows his package weighs 5 pounds and 5 pounds equals approximately 2260 grams. Should he be charged the fee?
2. Grandma needs to take a minimum of 1200mg of calcium a day to help her bones. The Calcium vitamins you bought for her specifies that it provides a half of a gram of calcium per tablet. How many tablets does Grandma need to take?
3. Your friend created a raft to hang out on in the bay. The raft weighs 180 kg and measures 160.0 cm in length, 80.0cm in width, and 20.0 cm in depth. Will the raft float in water with a density of 1.00g/mL?
4. You are traveling in Canada in late May and want to paddleboard. The weather man reports that the water is going to be 12°C tomorrow. Will you freeze, boil, or survive in that water? Explain.
5. Why does all my milk say "homogenized" on the label? What does that imply?
6. Your friend wants to get all "gunk" out of the tap water at home and decides to use filter paper and a funnel to separate the water out because he wanted "filtered water." Will this work?
7. Your older sister in graduate school decorates her apartment with empty triple distilled whiskey bottles. What does triple distilled mean?
8. You took the top 20 quiz in social studies (graded out of 20 points) and earned a 16. What is your percent error?

Practice Packet: LEVEL 2 MATTER

9. In terms of density or particle arrangement, why is nitrogen used rather than helium to extinguish a fire?
10. Alfred says that if you heat water to its boiling point oxygen gas will form. He shows you a pot of boiling water with vapors coming off. What is your rebuttal?
11. While preparing for your flight to England, you decide to weigh all your travel items. You weighed your toiletries on your mom's food scale and they totaled 327.97grams. You weighed all your clothes on the bathroom balance and they totaled 20,672.5 grams. The label on your new suitcase boasted a low weight of 1kg. You get to the airport knowing the weight limit is 22kg and mom is freaking out. You are cool as a cucumber. Why?

